<u>Т</u> Ω

JPEG COMPRESSING AND ENCODING SYNTHESIZING COMPONENT COLOR 0106 LINO LINO 0105 NNI BIT INFORMATION ADDED INFORMATION EMBEDDING MEMORY 0107 0104 AND DECODING UNIT EMBEDMENT POSITION DETERMINING EXPANDING OUTPUT RESOLUTION OF PRINTER JPEG, 0103 LIND 0108 × **ARRANGEMENT** DETERMINING UNIT PRINTER RESOLUTION OF IMAGE **PATTERN** 0109 0110 REGISTRATION **EMBEDDING** SIGNAL HNS 0102 COLOR COMPONENT EXTRACTING L N S 0101

4

1/53

F1G. 2

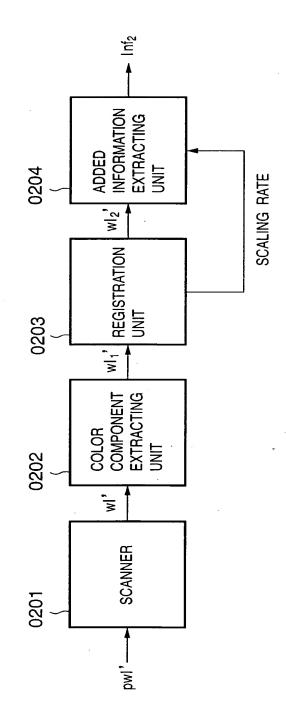


FIG. 3

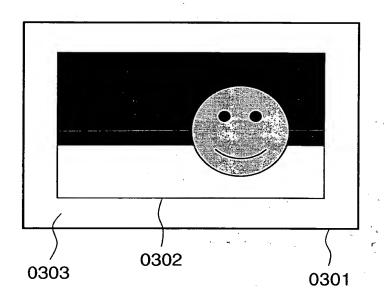


FIG. 4

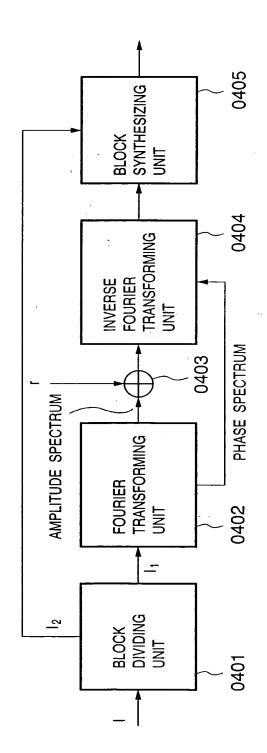


FIG. 5

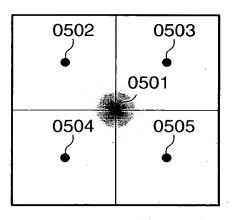
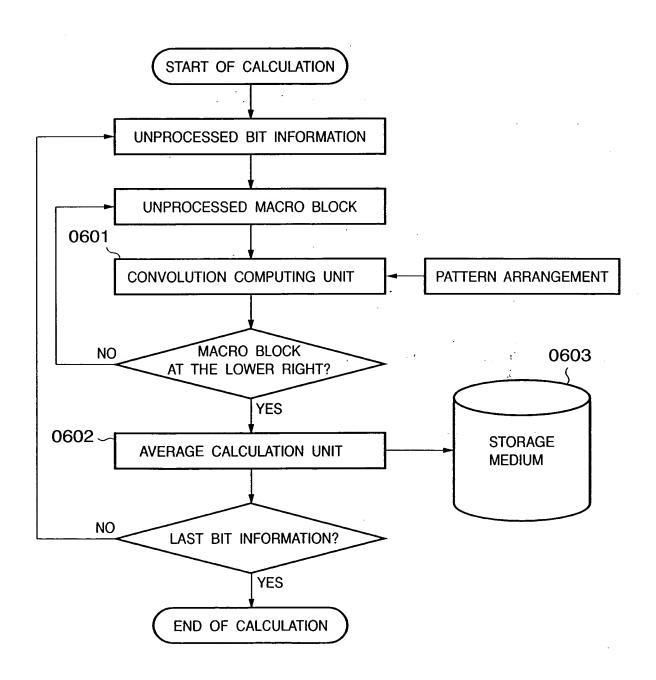


FIG. 6



F1G. 7

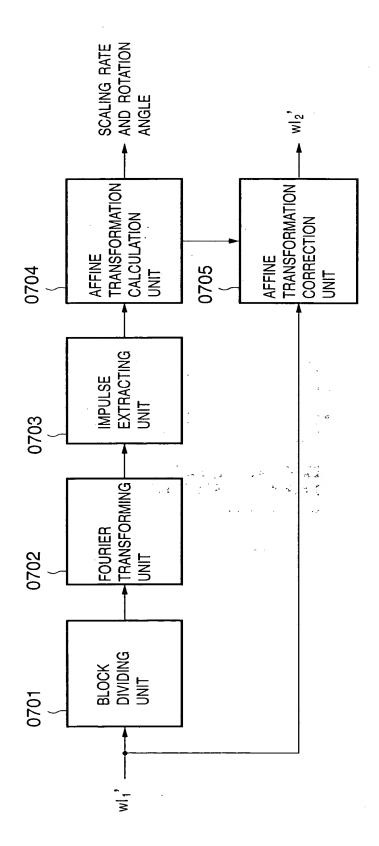


FIG. 8A

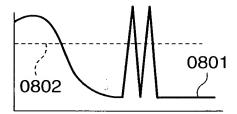
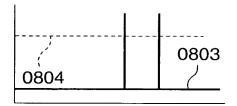


FIG. 8B



				0901							
						)					
+C	+C	+C	+C	0	0	0	0				
+C	+C	+C	+C	0	0	0	0				
+C	+C	+c	+C	0	0	0	0				
+C	+c	+C	+C	0	0	0	0				
0	0	0	0	-C	-с	-с	-с				
0	0	0	0	-с	-с	-с	-с				
0	0	0	0	-C	-с	, -C	-c				
0	0	0	0	-c	-с	-с	-с				

FIG. 10

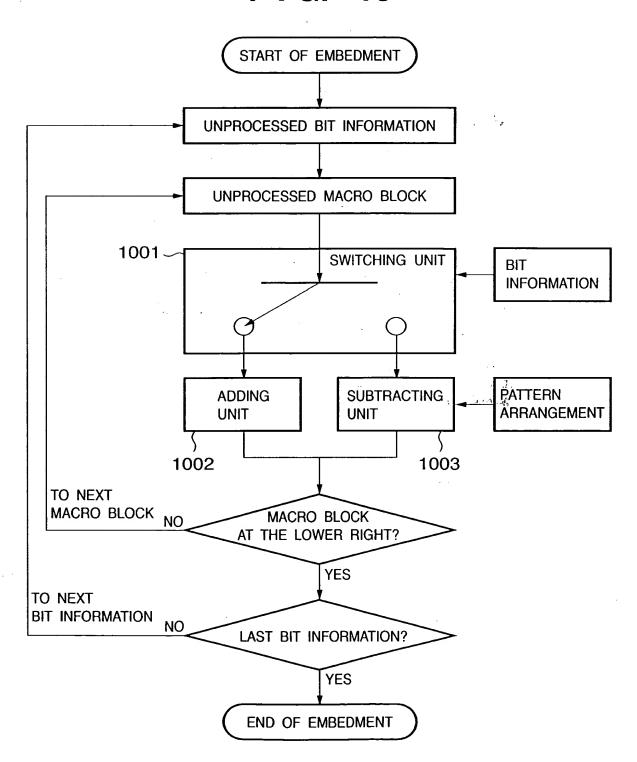
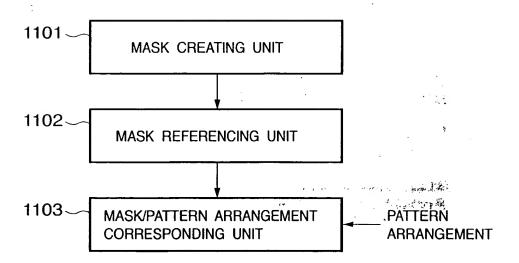


FIG. 11



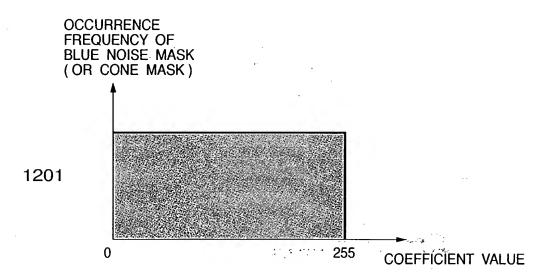
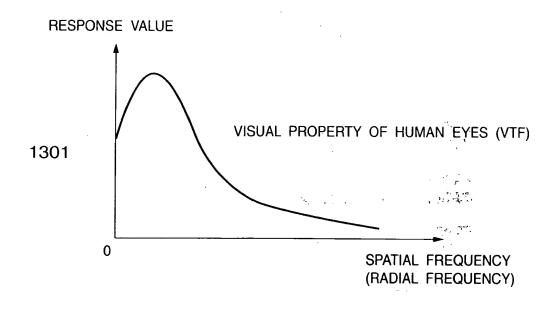


FIG. 13



### FIG. 14A

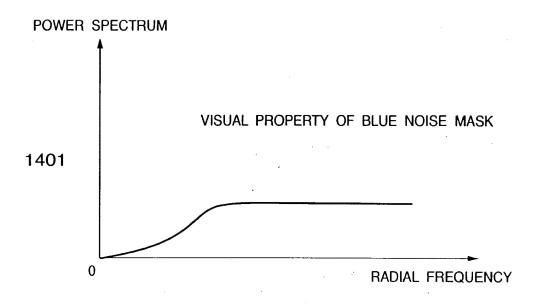


FIG. 14B

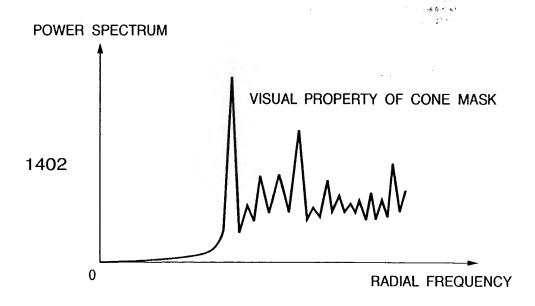


FIG. 15

			,	<b>1501</b>
0	14	13	3	
11	5	6	8	
7	9	10	4	
12	2	1	15	

FIG. 16

				<b>1601</b>
.0	14	13	3	
11	5	- 6	8	
7	9	10	4	
12	2	Ţ	15	•

### FIG. 17A

17( )	01		
o	14	13	.3
11	5	6	8
7	9	10	4
12	2	1.	15

### FIG. 17B

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- 1	7				A green	S. Carlo						ě	
									. 0	•	V etc	. 4.2	
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$\vdash$			 		_	 44.4	, 20 to 10 t		**************************************	100		· 李维·	
						美	# 15 學院	24 m				1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	<b>特别</b>
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		-		-			6 2 % 6 %	33.00	1	10		14.	200
							19.7	5	134°		1 (A)		

FIG. 18A

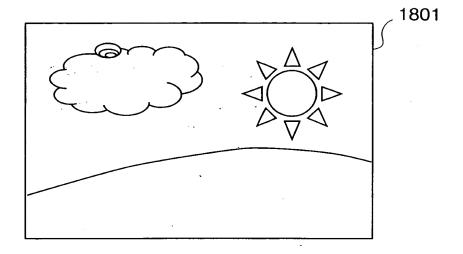
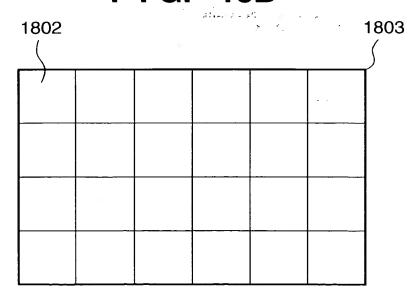
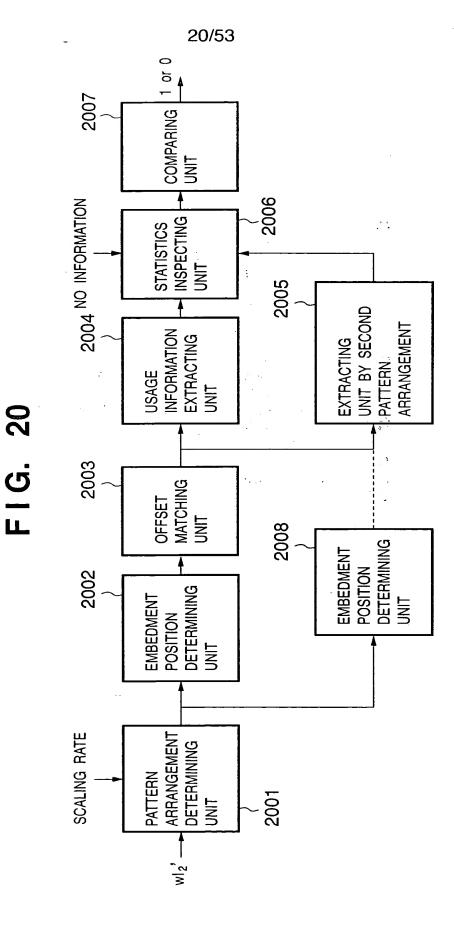


FIG. 18B



		19	/53		-			
a <sub>07</sub>	a <sub>17</sub>	a <sub>27</sub>	<b>a</b> 37	a47 -c	a57	a <sub>67</sub> င်	a77 -c	
a06	a <sub>16</sub>	<b>a</b> 26	<b>a</b> 36	a46 c	<b>a</b> se -င	မွေ ငှ	a76 -c	
<b>a</b> 05	<b>a</b> 15	<b>a</b> 25	<b>a</b> 35	a45 -c	a55 -c	а <sub>65</sub> -С	a <sub>75</sub>	
<b>a</b> 04	a <sub>14</sub>	<b>a</b> 24	<b>a</b> 34	a44 -c	a <sub>54</sub> -c	a <sub>64</sub> -c	a74 -c	5
a <sub>03</sub> +c	a <sub>13</sub>	333 +C	န္တ န	a <sub>43</sub>	a <sub>53</sub>	ae3	<b>a</b> 73	Ľ
a <sub>02</sub> +c	a <sub>12</sub> +c	32 42	332 +C	<b>a</b> 42	a <sub>52</sub>	a <sub>62</sub>	a <sub>72</sub>	
a <sub>01</sub> +C	a +	a <sub>21</sub> +c	аз +С	a41	a <sub>51</sub>	a <sub>61</sub>	a <sub>71</sub>	
a <sub>00</sub> +c	a <sub>10</sub> +c	a <sub>20</sub> +c	မွ နင်	<b>a</b> 40	a <sub>50</sub>	<b>a</b> 60	<b>a</b> 70	
								•
0	0	0	0	ပု	ပု	ပု	ပု	
0	0	0	0	ပု	ပု	ပု	ပု	
0	0	0	0	ပု	ပု	ပု	Ų†	
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	-		+					•
<b>a</b> 07	a <sub>17</sub>	<b>a</b> 27	<b>a</b> 37	<b>a</b> 47	a <sub>57</sub>	a <sub>67</sub>	a <sub>77</sub>	
<b>a</b> 06	a <sub>16</sub>	<b>a</b> 26	<b>a</b> 36	<b>a</b> 46	<b>a</b> 56	<b>a</b> 66	a <sub>76</sub>	
<b>a</b> 05	<b>a</b> 15	a <sub>25</sub>	<b>a</b> 35	a <sub>45</sub>	a <sub>55</sub>	a <sub>65</sub>	a <sub>75</sub>	
<b>a</b> 04	a <sub>14</sub>	<b>a</b> 24	<b>a</b> 34	9 <sub>44</sub>	a <sub>54</sub>	a <sub>64</sub>	a <sub>74</sub>	<u>~</u>
<b>a</b> 03	a <sub>13</sub>	a <sub>23</sub>	<b>a</b> 33	a <sub>43</sub>	a <sub>53</sub>	aes	<b>a</b> 73	I(x, y)
<b>a</b> 02	<b>a</b> 12	<b>a</b> 22	<b>a</b> 32	a <sub>42</sub>	<b>a</b> 52	362	a <sub>72</sub>	
<b>a</b> 01	a <sub>11</sub>	a <sub>21</sub>	<b>a</b> 31	a <sub>41</sub>	a <sub>51</sub>	a <sub>61</sub>	a <sub>71</sub>	
a00	<b>a</b> <sub>10</sub>	<b>a</b> 20	<b>a</b> 30	<b>a</b> 40	<b>a</b> 50	<b>a</b> 60	a <sub>70</sub>	



F G. 21

				= 32¢			
0	0	0	0	ပု	ပု	ပု	ပု ့
0	0	0	0	ပု	ပု	ပု	ပု
0	0	0	0	ပု	ပ္	ပု	ပု
0	0	0	0	၁-	ე-	၁-	ပု
+C	<b>)</b> +	<b>2</b> +	2+	0	0	0	0
+C	<b>)</b> +	<b>0</b> +	<b>)</b> +	0	0	0	0
7	<b>)</b> +	<b>)</b> +	<b>)</b> +	0	0	0	0
7	<b>3</b> +	<b>)</b> +	<b>)</b> +	0	0	0	0
			6	<u> </u>			::

a <sub>0</sub> 7	a <sub>17</sub>	a <sub>27</sub>	<b>a</b> 37	a47 -c	a <sub>57</sub> -c	а <sub>67</sub> -с	a 77 6
<b>a</b> 06	<b>a</b> 16	<b>9</b> 58	98 <b>e</b>	a46 -c	<b>a</b> 56 -င	a <sub>66</sub> င	a <sub>76</sub>
<b>a</b> 05	<b>a</b> 15	g52	932	a45 -C	a <sub>55</sub>	365 -c	a75 -c
a <sub>04</sub>	a <sub>14</sub>	a <sub>24</sub>	<b>9</b> 34	944 -C	a <sub>54</sub> -c	а <sub>64</sub> -С	a <sub>74</sub> -c
ဗ္ဗ ဍ	a <del>1</del> 3 +c	a23 +C	933 +C	843	a <sub>53</sub>	a <sub>63</sub>	a <sub>73</sub>
902 4C	a <sub>12</sub> +c	922 +C	932 +C	g45	a <sub>52</sub>	a <sub>62</sub>	a <sub>72</sub>
9g 2	a <sub>11</sub> +c	a21 +C	931 +C	a41	a <sub>51</sub>	a <sub>61</sub>	a <sub>71</sub>
8g 2	a <sub>10</sub> +c	a <sub>20</sub> +c	930 930	a40	a <sub>50</sub>	ge0	<b>a</b> 70

I" (x, y)

CONVOLUTION

P(x, y)

# F1G. 2

			c	) 			
0	0	0.	0	ပု	ပု	Ų	ပ္ု
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0	0	0	0	ပု	ပု	ပု	ပု
0	0	0	0	ပု	ပု	ပု	ပု
<b>)</b> +	ဍ	ပ္	Ϋ́	0	0	0	0
9+	ပ္	ပ္	ပ္	0	0	0	0
<b>)</b> +	<b>)</b> +	<b>)</b> +	<b>2</b> +	0	0	0	O,
<b>)</b> +	9+	2+	ပ္	0	0	0	0
				<u> </u>			
a <sub>07</sub>	a <sub>17</sub>	a <sub>27</sub>	a <sub>37</sub>	a47	a <sub>57</sub>	a <sub>67</sub>	a <sub>77</sub>
<b>a</b> 06	<b>a</b> 16	<b>a</b> 26	<b>a</b> 36	946	<b>a</b> 56	a <sub>66</sub>	a <sub>76</sub>
g02	a <sub>15</sub>	952	<b>a</b> 35	a <sub>45</sub>	a <sub>55</sub>	a <sub>65</sub>	a <sub>75</sub>
a <sub>04</sub>	a <sub>14</sub>	<b>a</b> 24	<b>3</b> 34	<b>a</b> 44	a <sub>54</sub>	<b>a</b> 64	a <sub>74</sub>
a <sub>03</sub>	<b>a</b> 13	a <sub>23</sub>	333	343	a <sub>53</sub>	363	a73

**a**12

a<sub>11</sub>

**a**02

**a**01

**9**00

**a**32

**a**31

**a**30

**a**22

**a**21

**3**50

**a**42

**a**41

**a**40

**a**52

**a**51

**a**50

**a**62

**a**61

**a**60

P(x, y)

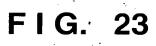
CONVOLUTION

I" (x, y)

**a**72

**a**71

a<sub>70</sub>



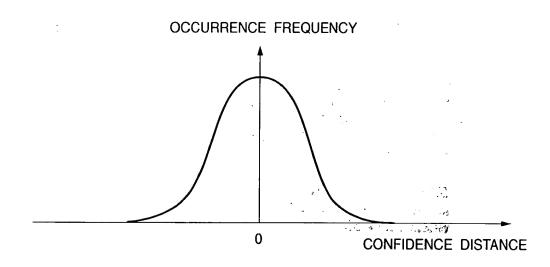


FIG. 24

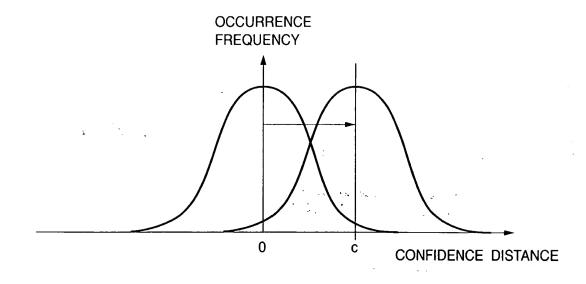
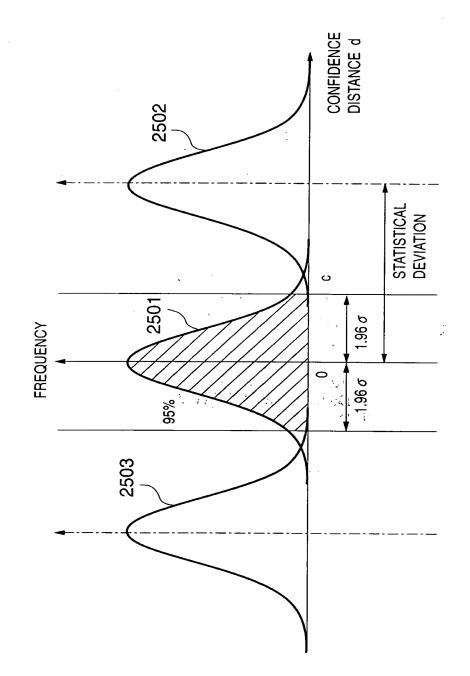
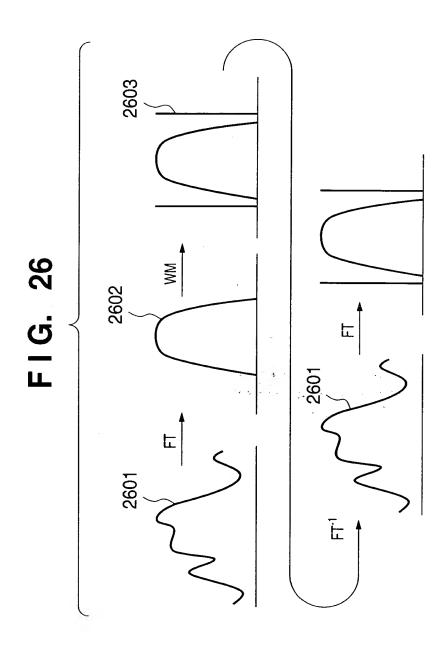
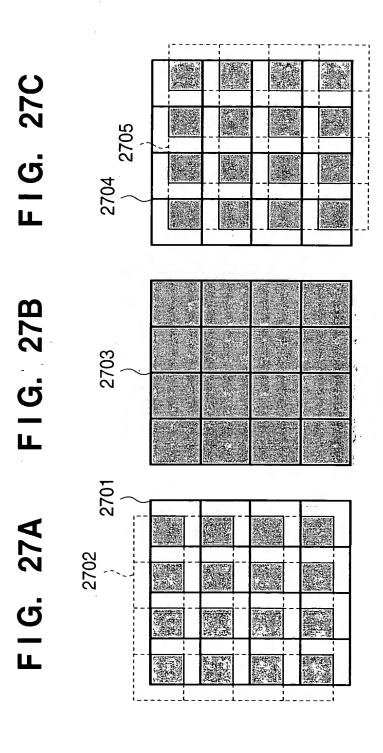


FIG. 25







28/53 FIG. 28 SEARCH FOR EMBEDMENT START POINT 2808 ROTATION ANGLE  $\phi = 0$ 2811 MAX = 0-2809 **INCREASE** DETERMINE POSITION OF START BITS ROTATION ANGLE \$\phi\$ 2801 DEFINE A SEARCH POINT (i, j) AS (0, 0). MAX = 0 2807 INCREASE (i, j) **DETECT START BITS** IN RASTER ORDER 2803 2802 NO T 11111? YES 2804 NO . . . 1  $\Sigma d > MAX?$ YES 2805  $MAX = \Sigma d.$  START POINT (x, y) = (i, j)2806 ALL SEARCH POINTS NO HAVE BEEN SERACHED YES 2810 NO ALL SEARCH ANGLES HAVE BEEN SERACHED YES EMBEDMENT START POINT (x, y) ROTATION ANGLE  $\phi$ 

FIG. 29

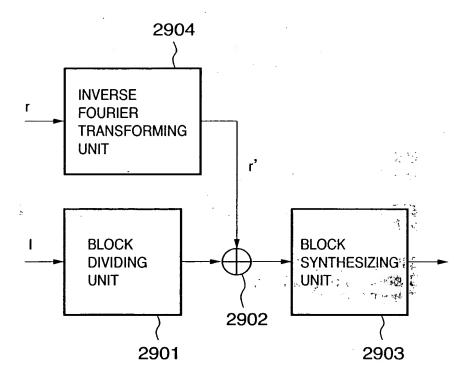
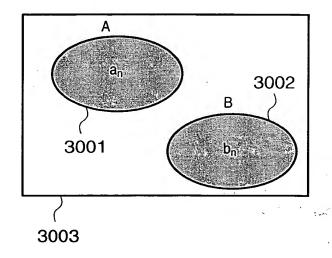
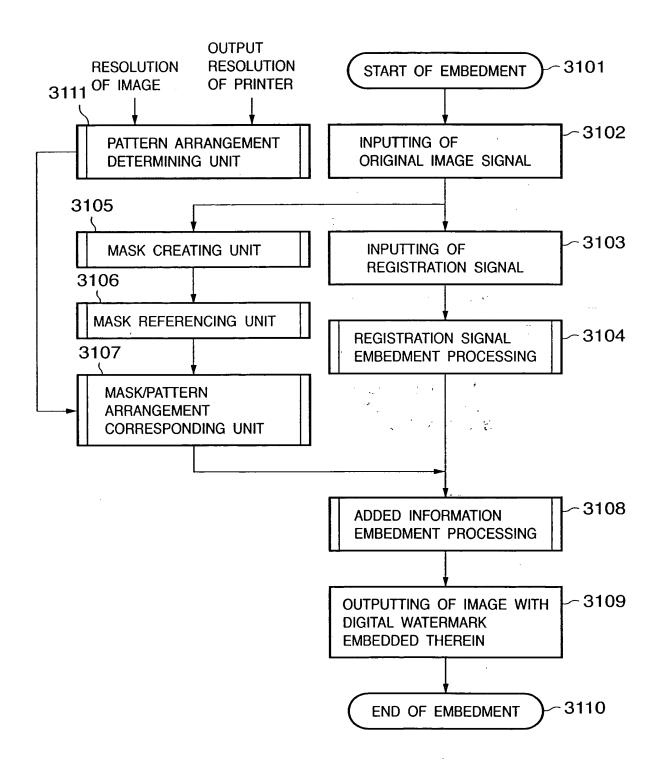


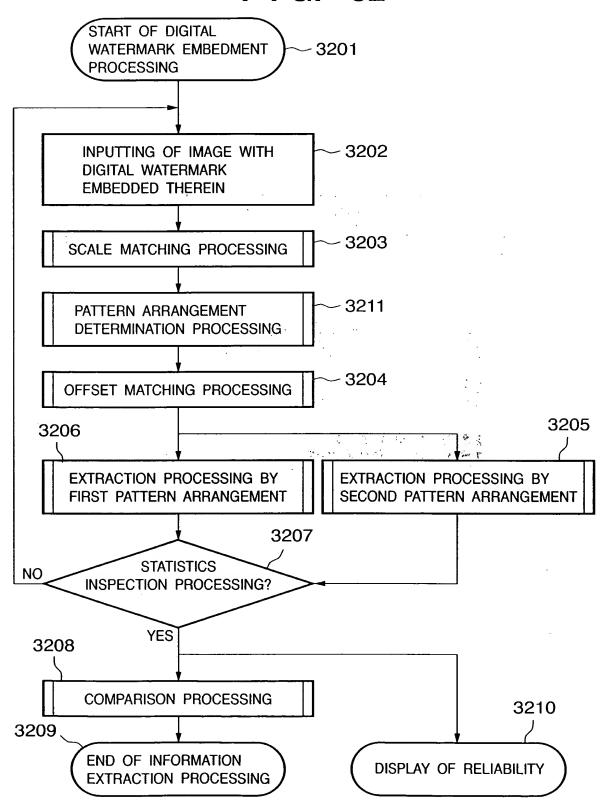
FIG. 30





32/53

FIG. 32



### FIG. 33A

### FIG. 33B

						,	3301 }
0	0	0	0	+C	+C	+C	+C
0	0	0	0	+C	+C	+C	·+C
0	0	0	0	+C	+C	+C	+C
0	0	0	0	+C	+C	+C	+c
-c	-с	-c	-с	0	0	0	0
-C	ပု	-с	-с	0	0	0	0
-c	-с	-с	-c	0	0	0	0
-c	-с	-c	-c	0	0	0	0

								}
	-с	-с	0	0	0	0	-с	-с
	-с	-c	0	0	0	0	-с	-с
	0	· 0	+C	+C	+c.	+C	0	0
	0 -	0	+C	+C	. <del>T</del> C	+C	0	0
		0	+C.	+C:	e+C	+C	0	0
h, 1	0	0	+C	+C	+C	+C	0	0
	-c	-c	0	0	0	0	-с	-с
	-c	-c	0	0	0	0	-c	-с

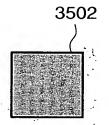
					c	) 				_
		0	0	0	0	ပု	ပု	ပု	ပု	
		0	0	0	0	ပု	ပု	ပု	ပု	
		0	0	0	0	ပု	ပု	ပု	ပု	
		0	0	0	0	ပု	ပု	ပု	ပု	,* · · · ·
		Ŷ	ပ္	Ý	ဍ	0	0	0	0	
		2	ပ္	우	우	0	0	0	0	
4	0901 ~	ပ္	ပ္	ပ္	ပ္	0	0	0	0	
ന		ဍ.	. ပ္	္ပ္	<u>2</u>	0	0	0	0	TION
F1G. 34					Q	<u></u>		\	. • "	CONVOLUTION
正		ပ္	우	ပ္	ပ္	0	0	0	*	8
		ပ္	ပ္	Ұ,	ပ္	0	0	0	0	95.71
		ပ္	ပ္	ပ္	ပ္	0	0	0	0	
		ပ္	ပ္	ပ္	ပ္	0	0	0	0	
		0	0	0	0	ပု	ပု	ပု	ပု	
		0	0	0	0	ပု	ပု	ပု	ပု	
	3301	0	0	0	0	ပု	ပု	ပု	ပ္	
		1	1	1	ı	1	1	1		í

FIG. 35A

FIG. 35B

3501

FIRST EMBEDMENT POSITION REFERENCE MASK



SECOND EMBEDMENT POSITION REFERENCE MASK

the state of

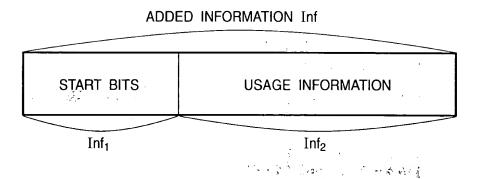


FIG. 37

69	9	211	9	217	16	35	190	101
87	7	197	109	180	117	212	71	114
166	3	28	55	143	104	146	85	130
64	1	206	179	48	240	232	108	154
67	7	40	91	224	37	32	223	194
203	3	214	:106	231	169	4	208	24
47	7	195	27	61	,2	155	81	213
251	1	84	202	184	170	10	46	138

COEFFICIENT LAYOUT OF BLUE NOISE MASK (PARTIAL)

## FIG. 38

_						_		
L	· 73	244	124	207	70	254	117	196
	38	177	11	132	43	186	4	138
	104	221	93	231	100	211	85	237
	23	151	55	165	26	153	56	172
	67	250	113	193	79	240	123	203
	47	188	1	142	33	183	14	128
	96	215	83	232	111	218	91	227
	28	157	60	171	17	147	51.	160

COEFFICIENT LAYOUT OF CONE MASK (PARTIAL)

FIG. 39

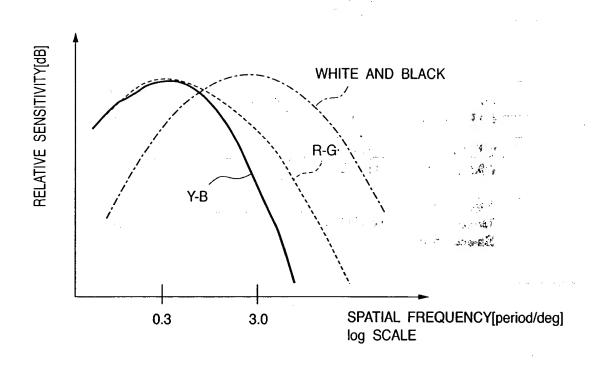
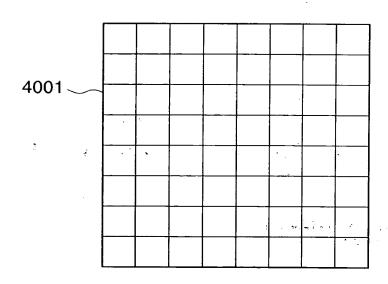


FIG. 40



MINIMUM CODING UNIT (MCU)

# FIG. 41

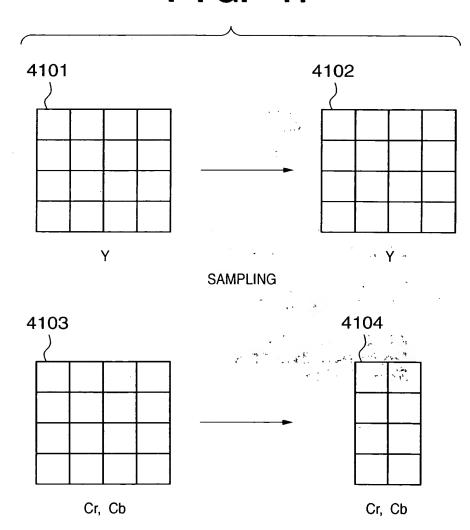


FIG. 42

4201 -	.+c	+Ç	+C	+ć	0	0	0	0	
	+C	+¢	+c	+C	0	0	0	0	. *
	+C	+C	+C	+c	0	-0	0	0	-
	÷C	+c	+c	+ċ	0	0	0	0	
	0	0	0	0	Ċ.	-C	, C	-C	~ 4202
	0	0	0	0	-C	-C	Ċ	-C	
	0	0	0	0	Ç.	Ċ	Ą	-C	The second second
	0	0	0	0	φ. •	÷	<sup>†</sup> -C	-C	

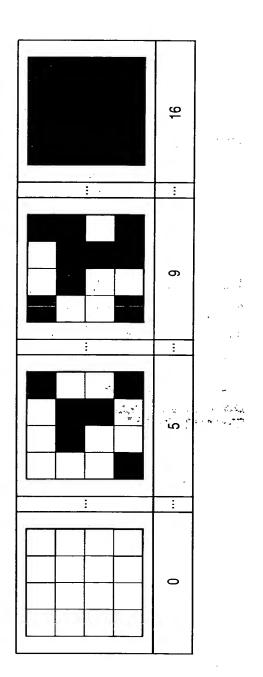
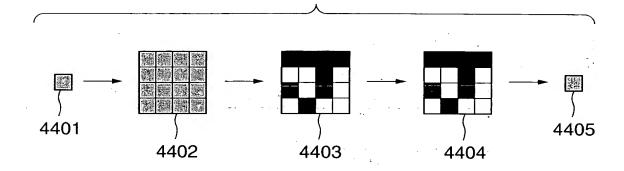
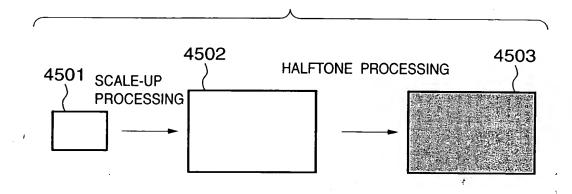


FIG. 44



### FIG. 45A



#### FIG. 45B

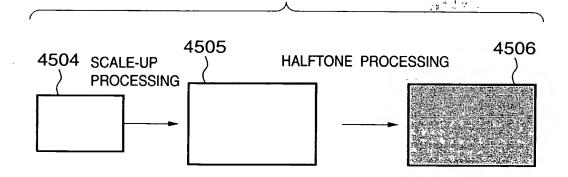
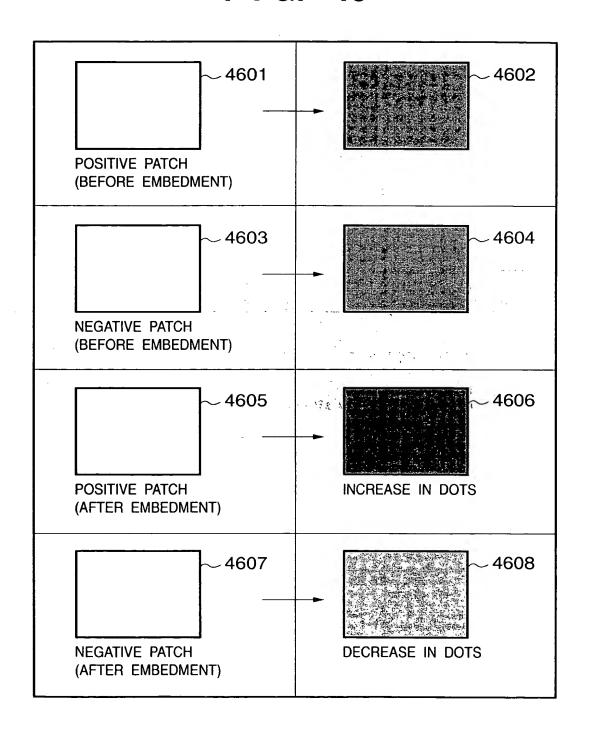
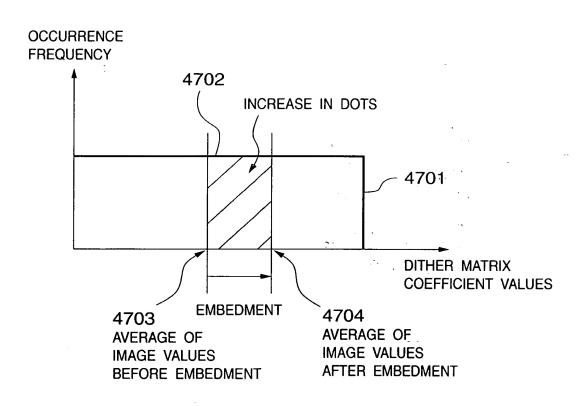


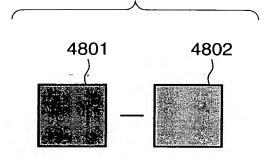
FIG. 46



#### FIG. 47

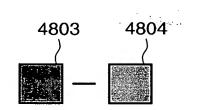


### FIG. 48A



#### FIG. 48B

True Tr



DIFFERENTIAL OF PATTERN ARRANGEMENT UNITS

# FIG. 49A

FIG. 49C

					4	49( <i>)</i>	01
+c	+C	+C	+C	0	0	6	0
+C	+C	+C	+c	0	0	0	0
+C	+C	+C	+C	0	0	0	0
+C	+C	+C	+C	0	0	0	0
0	0	0	0	-c	-c	-c	-Ç
0	0	0	0	-c	-c	-c	Ÿ
0	0	0	0	-C	-c	-с	-с
0	0	0	0	-с	-C	ç	ç

4902									
						Z			
0	0	0	0	+C	+C	+c	+C		
0	0	0	0	+C	+C	+C	+C		
0	0	0	0	+C	+C	+C	+C		
0	0	0	0	+C	+C	+C	+C		
-Ç	-c	-c	-c	0	0	0	0		
-c	-c	-C	-c	0	0	0	0		
Ÿ	-с	-c	<b>-</b> C	0	0	0	0		
-c	-с	-c	-C	C		0	0		

FIG. 49B

FIG. 49D

									4	90	3
										)	
+c	+C	+C	+C	+C	+C	0	0	0	0	0	0
+C	+C	+C	+C	+C	+C	0	0	0	0	0	0
+C	+C	+C	+C	+C	+C	0	0	0	0	0	0
+C	+C	+C	<b>+</b> C	+C	+C	0	0	0	0	0	0
+C	+C	+C	+C	+C	+C	0	0	0	0	0	0
+C	+C	+C	+C	+C	+C	0	0	0	0	0	0
0	0	0	0	0	0	-c	-c	-C	-Ç	-C	-C
0	0	0	0	0	0	-c	-c	٠	Ģ	-C	-C
0	0	0	0	0	0	-c	ç	Ļ	Ļ	-C	-C
0	0	0	0	0	0	-c	<b>-</b> C	-C	ç.	-C	-c
0	0	0	0	0	0	-c	-C	-c	-c	-С	-с
0	0	0	0	0	0	-с	-c	-C	-C	-с	-c

		in the						4	90	4	
		*	' .   :	ی	r. 🕏	ું કર્યા	4			)	
0	0	0	0	0	0	-c	-C	-c	-c	-c	-c
0	0	0	0	0	0	-с	-c	-c	-c	-c	-C
0	0	0	0	0	0	-c	-c	-c	-c	-c	-c
0	0	0	0	0	0	-c	-c	-C	-c	-c	-C
0	0	0	0	0	0	-c	-c	-c	-c	-c	-c
0	0	0	0	0	0	-c	-c	-C	-c	-C	-c
+C	+C	+C	+C	+C	+C	0	0	0	0	0	0
+c	+C	+C	+C	+C	+C	0	0	0	0	0	0
+c	+C	+C	+C	+C	+C	0	0	0	0	0	0
+C	+C	+C	+C	+C	+C	0	0	0	0	0	0
+c	+C	+C	+C	+C	+C	0	0	0	0	0	0
+C	+C	+C	+C	+C	+C	0	0	0	0	0	0

FIG. 50A

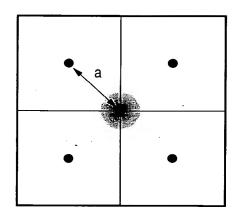
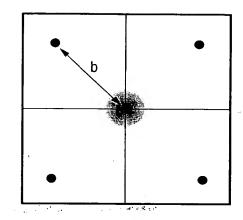


FIG. 50B



F.I G. 51A

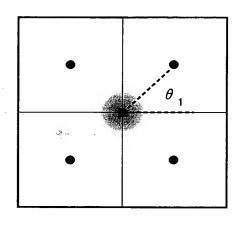


FIG. 51B

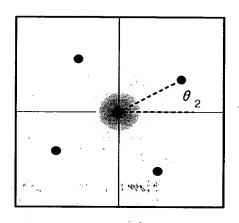


FIG. 52

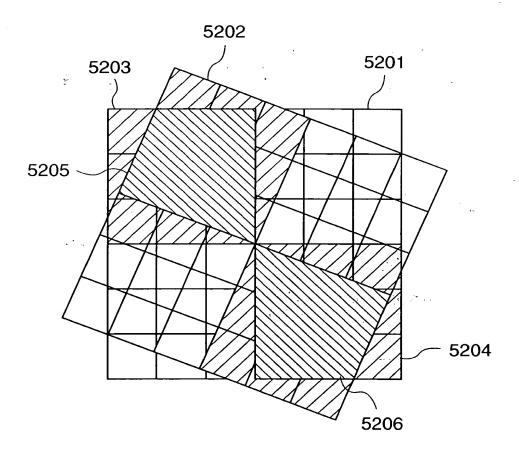


FIG. 53

